COMMUNITY ENERGY RESILIENCE FRAMEWORK

NOVEMBER 2023

SILICON VALLEY CLEAN ENERGY

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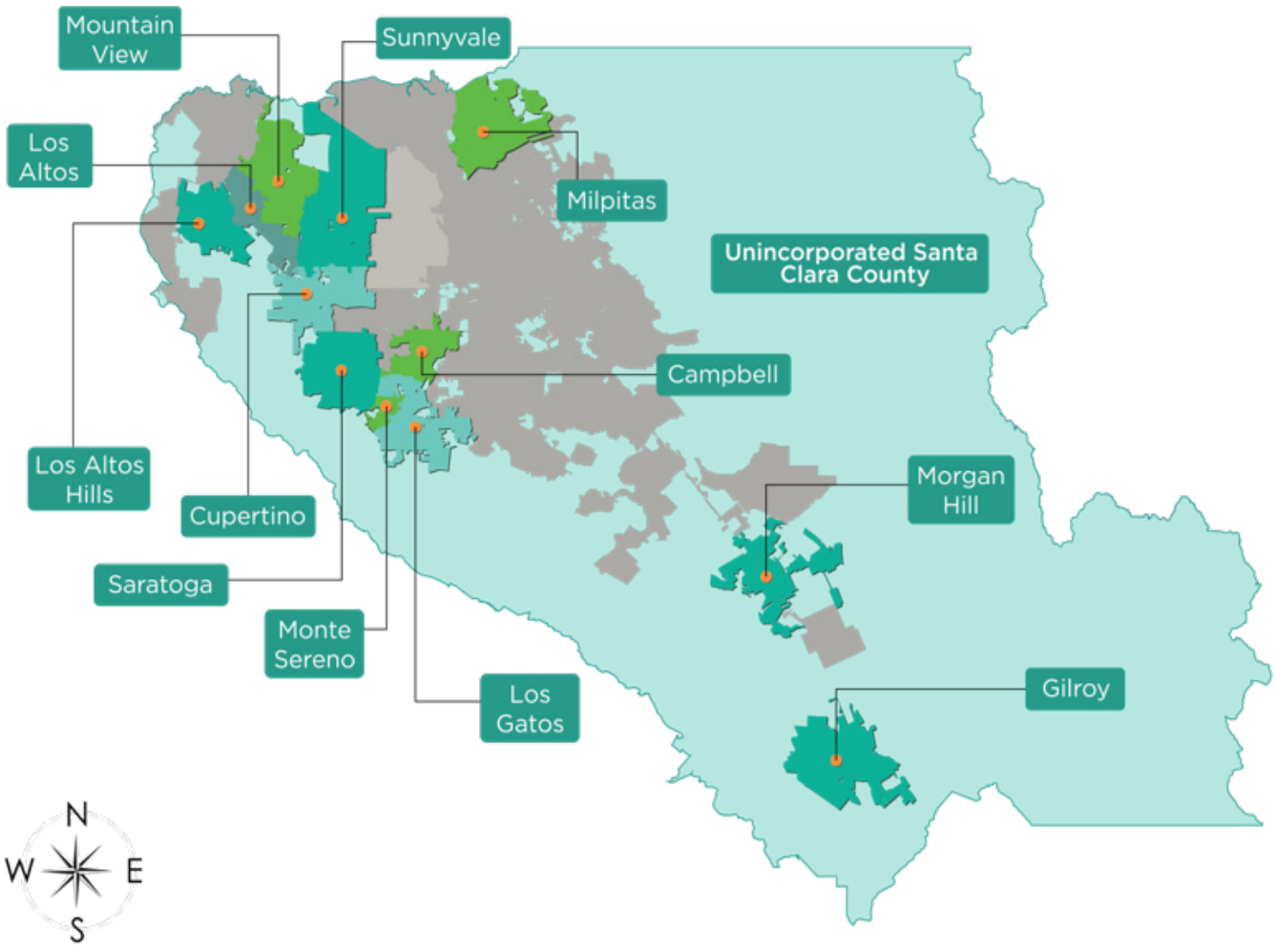
FOREWORD

About Silicon Valley Clean Energy

Silicon Valley Clean Energy (SVCE) is the community choice aggregator (CCA) that provides clean electricity for 270,000 residential and business customers in 13 communities across Santa Clara County. These communities include Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Saratoga, Sunnyvale and Unincorporated Santa Clara County. SVCE provides renewable and carbon-free electricity to customers, playing a vital role in curbing greenhouse gas (GHG) emissions and transitioning the region to a clean and resilient energy future.



Acknowledgments

Silicon Valley Clean Energy gives thanks to the following member jurisdictions and organizations for lending their expertise and invaluable input during the Community Energy Resilience Framework development process:

Bay Area Climate Adaptation Network (BayCAN)

City of Campbell

City of Cupertino

City of Gilroy

City of Los Altos

Town of Los Altos Hills

Town of Los Gatos

City of Milpitas

City of Monte Sereno

City of Morgan Hill

City of Mountain View

City of Saratoga

City of Sunnyvale

County of Santa Clara

Engie Services U.S.

Marin Clean Energy (MCE)

Pacific Gas & Electric (PG&E)

Sonoma Clean Power (SCP)

Silicon Valley developed this Community Energy Resilience Framework with support from Buro Happold and Alternative Energy Systems Consulting, Inc.

Overview

As California transitions to a decarbonized economy, it is essential that SVCE works to build a clean, resilient and equitable energy future. While energy resilience has always been important, climate change makes it more so: as global temperatures rise, the risk of local power outages will increase due to increased strain on grid infrastructure and the threat of wildfire. Pacific Gas & Electric (PG&E) and other stakeholders are working to increase the resilience of the electricity system at the grid level in various ways, including grid hardening, and the undergrounding of transmission lines.

These statewide efforts are essential, but insufficient. Achieving resilience requires coupling these grid-level interventions with local action: at the site, neighborhood and community scale. These efforts, in tandem with community-level efforts that work to bolster capacity to respond to outages, can reduce the impacts of power outages — even in a changing future. Consequently, in 2020, SVCE's Board of Directors committed to investing $5.15 million in community energy resilience. This Framework is one resource from that investment. SVCE is best positioned to support site and community level resilience as it does not have control over the grid infrastructure itself.

SVCE's mission is to reduce dependence on fossil fuels by providing carbon-free, affordable and reliable electricity and innovative programs for the SVCE community. SVCE developed its Community Energy Resilience Program with that in mind, and decarbonization will continue to underpin future resilience efforts. For example, investments in battery back-up systems reduce the need for fossil fuel back-up, and they build consumer confidence in clean alternatives. Electric heat pumps, as another example, are a fundamental decarbonization strategy and increase resilience by providing more energy-efficient cooling as rising temperatures increase demand for air conditioning (AC).

Holistically incorporating energy resilience into SVCE's programmatic approach ensures that it invests in solutions that work not just today, but also in a hotter, drier and more disrupted future. Resilience futureproofs SVCE's work, serves as a co-benefit of other decarbonization efforts and helps accelerate decarbonization. This Framework helps make that possible, laying out goals, guiding principles and approaches for action that SVCE will use to integrate resilience more systematically into program design and implementation.

Community Resilience Program

In collaboration with, and through the support of Member Agencies and local stakeholders, SVCE launched the Community Resilience Program in 2020. This program is a $5.15 million investment to support community energy resilience planning efforts, and develop local energy resilience projects at local critical community facilities. The emergent funds through this investment will enable local governments to increase resilience at a time when many Member Agencies are experiencing budget cutbacks.

COMMUNITY ENERGY RESILIENCE

The ability of a community to prepare for, adapt to, withstand and recover from power disruptions due to anticipated hazards.

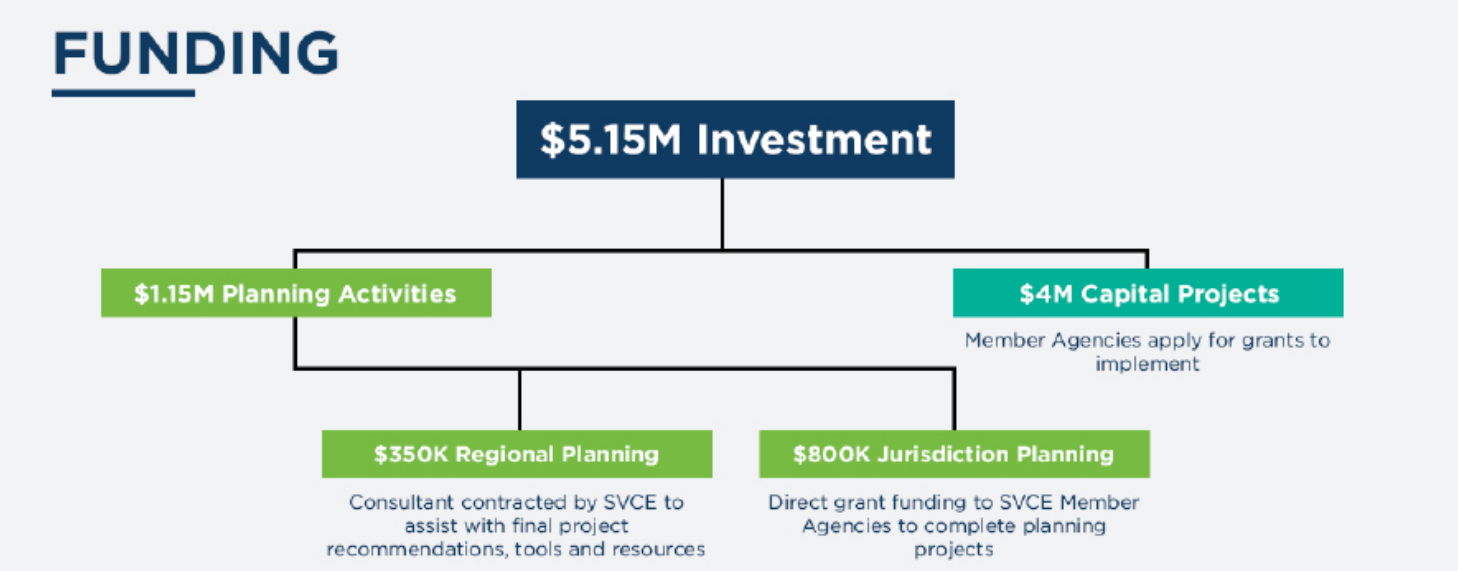


Figure 1: SVCE Community Energy Resilience program funding breakdown.

Addressing Equity through Resilience

Alongside resilience, SVCE values equity and is committed to embedding and advancing it throughout SVCE operations and programming. SVCE intends for these funds to also contribute to equitable outcomes within and among the communities it serves. Funding through the Community Resilience Program can and should be used to increase access to energy resilience solutions for everyone, as well as to support those most vulnerable to the impacts of a changing climate. In striving for equitable outcomes, there may be opportunities for funds to also spur job creation and workforce development opportunities for those that need it most.

About the Community Energy Resilience Framework

To guide the Community Resilience Program and the planning activities therein, SVCE presents this **Community Energy Resilience Framework**, intended to spur and guide interventions that alleviate the impacts of grid disruptions and help SVCE communities prioritize resilience projects for implementation. This Framework articulates a shared vision for community energy resilience: the ability of a community to prepare for, adapt to, withstand and recover from power disruptions due to anticipated hazards.

The Framework builds upon existing initiatives and identifies actionable opportunities for SVCE, its Member Agencies and other regional stakeholders to become more resilient. The Framework is the result of a collaborative process, reflecting input from leading industry experts, CCAs and Member Agencies.

FRAMEWORK COMPONENTS

Funding

- ***Community Energy Resilience Program —*** invests $5.15 million into local communities to plan for and implement energy resilience projects.

Guidance

- ***Community Energy Resilience Framework —*** lays out goals, guiding principles and approaches for implementing community energy resilience; serves as guidance for SVCE, Member Agencies and regional stakeholders to incorporate resilience into their programs and projects.

Technical Assistance

- ***Resilient Site Selection Tool —*** provides an interactive platform for Member Agencies to prioritize critical community sites and identify potential energy resilience solutions.
- ***Education & Technical Assistance —*** offers education and technical assistance to support Member Agencies with decision-making for community energy resilience projects.

Stakeholder Engagement

- ***Focus Groups and Expert Interviews —*** engages experts and stakeholders to inform strategies and actions based on real-world application and experiences.

This Framework identifies and defines five overarching goals to guide the achievement of community energy resilience, all falling under SVCE's overarching mission of decarbonization (see Figure 2): climate readiness, reliability, targeted investments, benefits maximization and equity.

GOALS	DESCRIPTION
Climate Readiness	Support communities in preparing for, and adapting to, climate impacts from extreme heat, wildfire and flooding
Reliability	Reduce strain on the grid, improve demand flexibility and enhance self-sufficiency
Equity	Enable equitable access to energy resilience solutions, develop workforce opportunities and support vulnerable populations
Benefit Maximization	Integrate and maximize multiple benefits for enhanced resilience
Targeted Investments	Prioritize investments to strategically improve energy resilience

Figure 2: Five overarching goals for SVCE's Community Energy Resilience Framework.

In this Framework, SVCE also presents five Guiding Principles that each address one or more of the five aforementioned goals and detail how SVCE can fulfill its mission of providing clean energy while also addressing climate change and preparing for emergent disruptions. These Guiding Principles will direct SVCE's efforts to incorporate energy resilience into its programs and create projects that yield multiple benefits, such as grid reliability, optimized energy performance, thermal comfort and safety, and reduced GHG emissions. Above all, they will enable SVCE and its communities to advance this work through a people-centered and equity-forward lens, as ultimately this work represents financial and human investment into SVCE communities, aiming to reduce the impacts of climate change for those most vulnerable to them — now and in the future.

This document provides an overview of the region's key vulnerabilities to its energy systems, as well as a menu of technological and programmatic solutions that can mitigate those vulnerabilities and increase resilience. Finally, the Framework itself is presented via five Guiding Principles that inform SVCE's approaches to building a more energy-resilient region. The structure of the Framework is outlined in the call-out box.

HOW TO READ THIS FRAMEWORK

Guiding Principles

Guiding principles are the primary means by which SVCE will integrate community energy resilience into programs and projects across its service area.

Approaches to Action

Approaches to action are examples of how SVCE is applying its guiding principles, as well as where there are still opportunities for SVCE to act.

Principles in Practice

Principles in practice are specific case studies, showing real-life examples of how the guiding principles are being put into practice and their impact.

REGIONAL VULNERABILITIES

Over the next several decades, Silicon Valley will become hotter and drier, and it will face increasingly frequent and severe extreme climate and weather events, such as fires, heat waves, floods and drought. As a result, the risk of grid outages will increase due to resulting equipment damage, reduced efficiency, reduced capacity and increased demand for cooling. The risk of compounding hazards amplifies these impacts, as multiple disasters can occur simultaneously (e.g., a heat wave alongside a wildfire).

Climate events can create energy system disruptions, such as public safety power shutoff (PSPS) events, that can disrupt daily life for a few hours, or in the worst cases, several days. Given that electricity is a critical node to infrastructure systems and community health, grid outages have cascading impacts. For example, an outage can disrupt or shut down traffic lights and other transportation infrastructure, delaying or preventing people from commuting to work, or even getting in the way of maintenance professionals tasked with diagnosing and repairing that infrastructure.

To deploy the preparatory and technological solutions that will mitigate climate change and build resilience, it is critical to understand the region's specific vulnerabilities with respect to climate change and its impacts. This section provides an overview of the region's climate and environmental vulnerabilities, including extreme heat, wildfire, precipitation, flooding and drought and earthquakes.

Knowing these vulnerabilities will better prepare SVCE, residents and businesses for the risks that accompany them, such as prolonged grid disruptions. They will also enable decision-makers to better prescribe and install the technical solutions (e.g., building and appliance electrification, distributed energy resources, etc.) that will protect the social and physical infrastructure that relies on the grid. Finally, they will guide the programs and initiatives that will support residents and businesses as they transition toward and utilize those technical solutions.

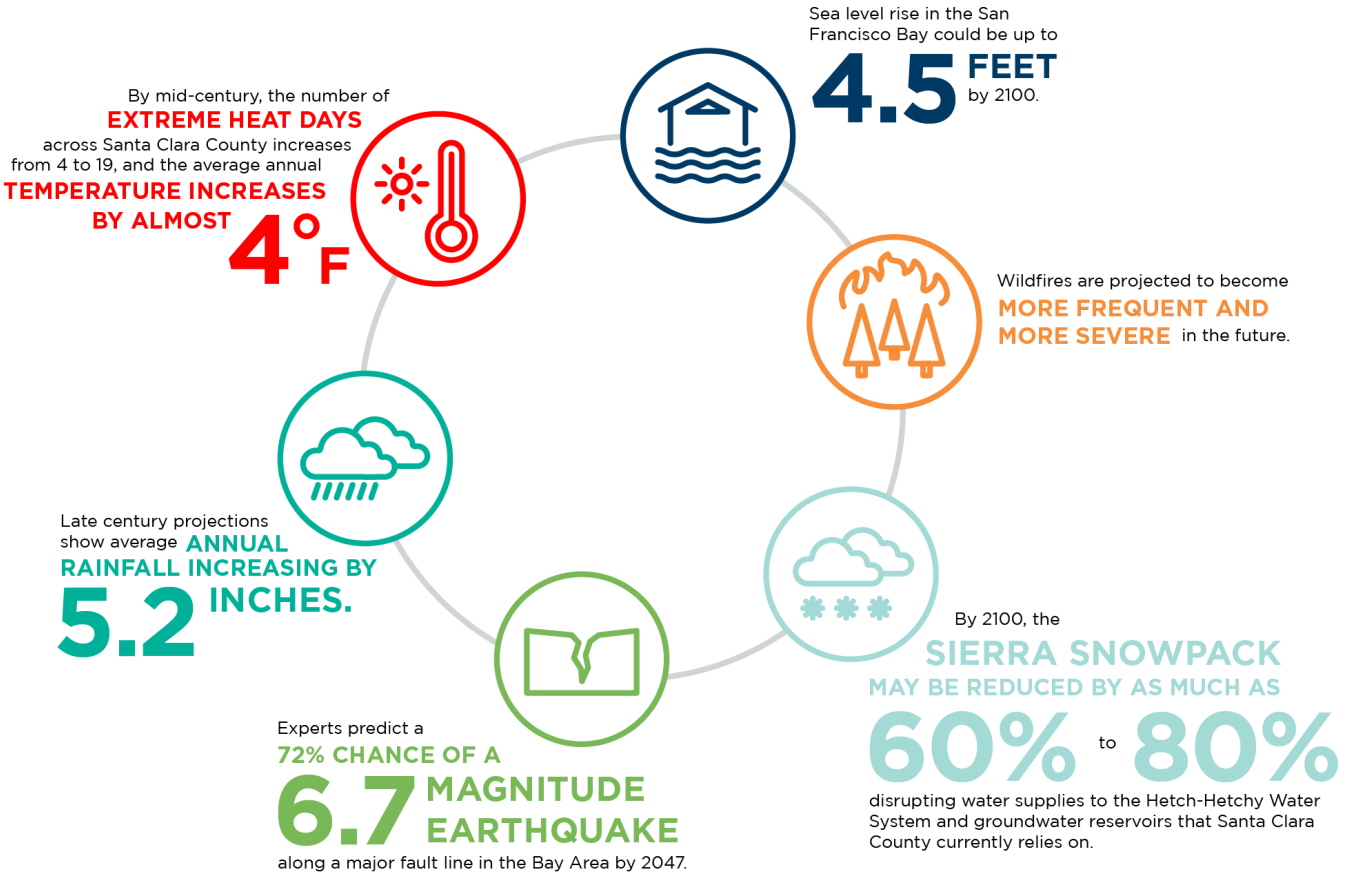


Figure 3: Regional vulnerabilities in Santa Clara County.

Sources: Cal-Adapt, Number of Extreme Heat Days by Year (2050-2060). Cal-Adapt, Extreme Precipitation Events (Late Century). USGS, Earthquake Outlook for the San Francisco Bay Region 2014-2043. 2018 California Fourth Climate Assessment

Extreme Heat

Extreme heat is one of the most dangerous impacts of climate change. Extreme heat can cause heat-related illnesses such as heat stroke, especially when someone is exposed for a prolonged period. The impacts can be particularly severe for older adults, young children, people with chronic conditions, outdoor workers and people experiencing homelessness. As it pertains to infrastructure, extreme heat can reduce transmission line efficiency and strain the power grid. The combination of reduced efficiency and grid capacity with increased cooling demand can lead to rolling brownouts. Extreme heat can also escalate and amplify Urban Heat Island (UHI) effect, referring to increased and focused heat in urban areas where there are more buildings and paved surfaces and less vegetation.

Historically, SVCE customers have not relied on air conditioning (AC) to cool their homes, but increasing summer temperatures and extreme heat days each year will spur more customers to procure and utilize AC systems at times when the grid is already stressed.[1] To address and mitigate extreme heat, communities and decision-makers alike will need to explore solutions outside of electricity-powered AC to keep people cool. For instance, building design and urban planning offer solutions such as vegetation and canopy cover, passive design and cool surfaces that can protect urban communities from extreme heat and reduce the UHI effect.

Wildfire

Wildfires destroy hundreds of thousands of acres of land annually in California, displacing residents and compromising millions of dollars' worth of public and private property. Wildfire risk intensifies with higher temperatures and dry vegetation, both of which are exacerbated by climate change. They also tend to impact energy services: some of the largest wildfires have been triggered by knocked down powerlines in Fire Hazard Severity Zones due to high winds, resulting in prolonged outages. In addition, the resulting soot and air pollution from wildfires can decrease electricity transmission line efficiency.

Large areas of Santa Clara County are in "Very High" Fire Hazard Severity Zones (FHSZs) and are prone to wildfire, including portions of unincorporated Santa Clara County, Los Gatos, Morgan Hill, Saratoga and Monte Sereno. As a result, the SVCE service area may become especially susceptible to PSPS events. And while some communities are not directly within fire zones, they may still be impacted by poor air quality from smoke. Without adequate AC or air filtration systems, these impacts may follow people indoors. The accompanying power outages can pose significant challenges to individuals dependent on electricity, including medical baseline customers and individuals who are food insecure and rely on refrigeration.[2]

1 Cal-Adapt. Number of Extreme Days by Year (2050-2060). <https://cal-adapt.org/tools/extreme-heat/>

2 Customers who receive Supplemental Nutrition Assistance Program benefits or have tight budgets, may experience additional food insecurity if refrigerated products are lost. SNAP does provide some benefits to impacted beneficiaries if food is lost during a disaster, under the D-SNAP program.

Precipitation, flooding and drought

While average rainfall is not projected to increase significantly by mid-century, the projected variability in rainfall, or "precipitation whiplash," will lead to more extreme wet and dry periods.[3] Relatedly, snowpack in the Sierras is expected to decline by 60-80% between now and 2100.[4] These conditions will contribute to the elongation and exacerbation of drought across California. Drought is of particular and increasing concern in Silicon Valley, which still falls under the classification of "severe drought" per the U.S. Drought Monitor.[5] Collectively, these trends in precipitation and snowpack levels stand to affect water availability communities, as well as for hydroelectric and thermal power plants.

Portions of SVCE territory will be impacted by flooding due to extreme precipitation and rising sea levels, potentially leading to temporary or permanent displacement.[6] Flooding can cause significant property damage and impact infrastructure, and sea level rise may more frequently or permanently flood coastal areas where power plants and substations tend to be located. The resulting saltwater intrusion can damage underground infrastructure. While permanent sea level rise will likely necessitate the shifting or relocation of existing energy infrastructure, temporary inundation stemming from flood events will create service disruptions and inhibit the prompt diagnosis and repair of that infrastructure.

Earthquakes

The San Andreas Fault runs through western Santa Clara County and numerous unincorporated communities in SVCE service territory.[7] In the event of an earthquake, there may be disruptions to power, communication, transportation and water infrastructure. Damage to underground and overhead powerlines and other distribution infrastructure could lead to prolonged power and water outages.

Each of these hazards has the potential to disrupt electricity and other critical services in the SVCE service area. As such, investing in community energy resilience solutions can help SVCE customers prepare for and withstand these disruptions, as well as mitigate the impacts of climate change. The next section explains how multiple technical energy resolutions are viable for investment and installation across the SVCE service area to address these hazards.

3 Cal-Adapt. Extreme Precipitation Events. <https://cal-adapt.org/tools/extreme-precipitation>

4 Santa Clara County. Silicon Valley 2.0 Climate Adaptation Guidebook. <https://www.sccgov.org/sites/osp/Documents/SV2/1_150803_Final%20Guidebook_W_Appendices.pdf>

5 National Drought Mitigation Center, University of Nebraska-Lincoln. "U.S. Drought Monitor – California". <https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?CA>

6 Pacific Gas and Electric Company. Climate Change Vulnerability Assessment and Resilience Strategies. <https://www.pgecurrents.com/wp-content/uploads/2016/12/PGE_climate_resilience_report.pdf>

7 Santa Clara County Office of Emergency Services. 2017 Santa Clara County Hazard Mitigation Plan. <https://www.sanjoseca.gov/home/showdocument?id=41887>

ENERGY RESILIENCE SOLUTIONS

Energy utilities and operators have long managed climate vulnerabilities through grid-focused solutions such as routine maintenance, grid modernization and hardening. While these measures reduce the occurrence of power disruptions, they cannot completely prevent outage risks to electricity-dependent systems or mitigate downstream impacts to customers or communities. Consequently, investments in energy resilience solutions can better protect residents and businesses against the impacts of outages when they occur.

Energy resilience solutions, such as distributed energy resource (DER) technologies and programs, building appliances and systems and urban design interventions, modify electricity demand by reducing energy loads, shifting loads to off-peak hours and generating or storing electricity for emergency and peak time usage.

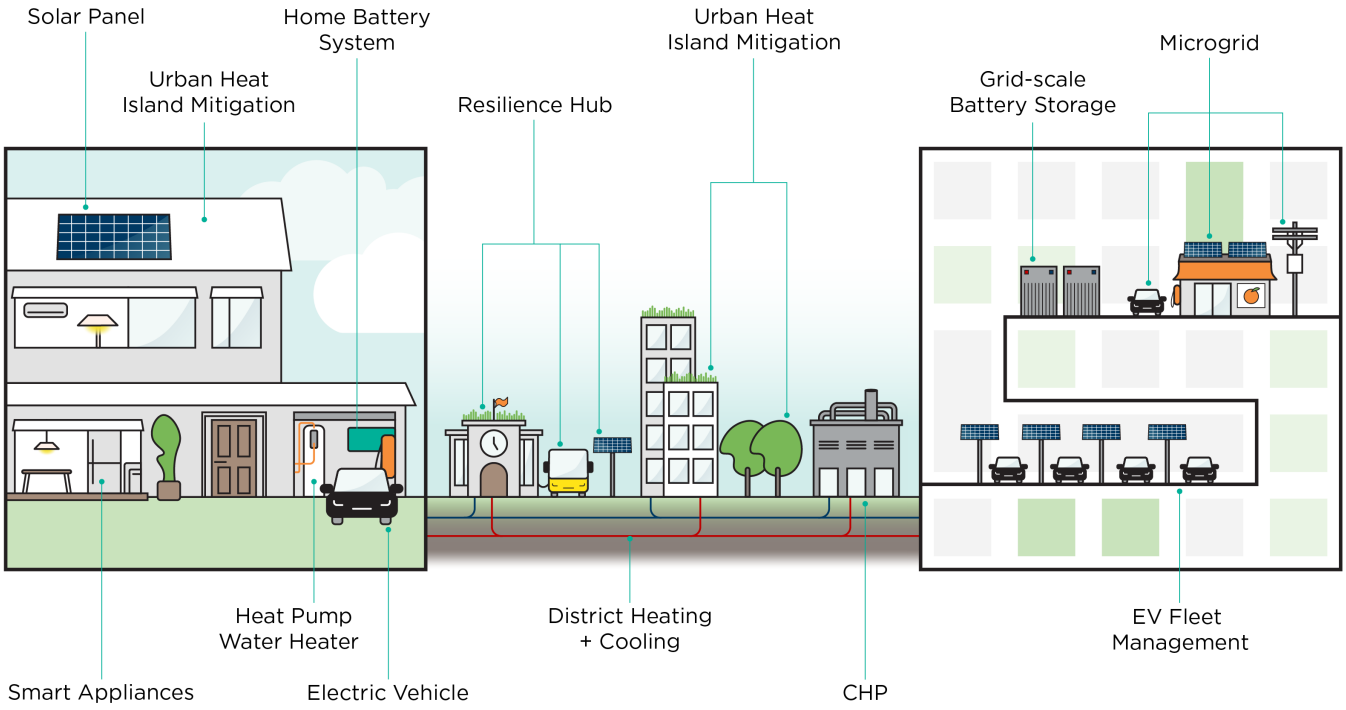


Figure 4: Diagram of energy resilience solutions in residential and commercial environments.

- DER technologies, such as solar and combined heat and power (CHP), localize power generation and reduce dependence on the grid during power outages.

- Battery (home and grid-scale) and thermal storage systems provide energy during power failures and relieve grid congestion during peak load conditions.

- Electric vehicles (EV) and EV fleets can serve as energy storage devices which reduce grid strain by integrating excess renewable generation (i.e., “vehicle-to-building” technology).

- Microgrids and district energy systems can integrate multiple electric and thermal systems to create local energy networks and resilience hubs that can operate independently from the grid.

- Efficient building systems, smart appliances and passive design standards decrease building energy needs. UHI mitigation strategies such as green and cool roofs, urban tree canopy and shade structures reduce the need for cooling and reduce grid strain during extreme heat events.

COMMUNITY ENERGY RESILIENCE FRAMEWORK

Guiding Principle #1

Enhance energy resilience and demand flexibility through customer engagement and program expansion

Engaging customers and expanding programs play a key role in increasing local energy resilience and demand flexibility. Demand flexibility is, in turn, a key strategy to support greater grid reliability and reducing outages. Customer communications on the importance of reducing electricity consumption during peak times, and programs that simplify and incentivize load shifting, empower customers to change their habits to behaviors that benefit the grid.

To date, SVCE's efforts have included clean energy customer programs that offer both decarbonization and resilience benefits. To build on those efforts, SVCE plans to expand educational resources for customers to enable self-reliance and assist with preparedness and response planning. While residential and commercial customers can regularly access SVCE resources through the SVCE eHub and participate in SVCE programs, they may not be aware of their resilience benefits or how they can help customers prepare for future disruptions or events.

To build customer awareness, SVCE will integrate information on energy resilience and demand flexibility into its programs and its conversations with customers. As a part of this effort, SVCE will expand Community Resilience Grant options to assist interested organizations with resilience hub planning and development, as well as to support Member Agencies in developing communication and education programs on energy resilience.

Approach: Integrate resilience into customer education and outreach campaigns for SVCE programs that support decarbonization and electrification.

What SVCE is doing:

- Communicating resilience benefits of existing electrification and decarbonization programs
- Administering funding for community engagement and communication support through Jurisdiction Planning Grants

Future opportunities:

- Develop energy resilience education and outreach materials for non-English speaking communities
- Undertake joint outreach campaigns with PG&E for communicating backup generation solutions available to electricity-dependent, medically fragile and low-income customers

PRINCIPLE IN PRACTICE | *SVCE ASSISTANCE TOOLS*

Enhancing energy resilience requires SVCE to engage with customers and enable them to make informed decisions regarding their energy use and sourcing. The SVCE eHub features electrification assistance tools that can be utilized for forthcoming programs. Whether they be through SVCE or its Member Agencies, these tools help customers compare and select clean energy solutions that also offer resilience benefits for them and for the grid.

EV ASSISTANT

SVCE's EV Assistant helps customers explore electric cars, locate charging stations and identify financial incentives, including federal and state tax credits. The platform assists customers in estimating cost and emissions savings from EVs, accessing charging infrastructure options for EVs and other micro-mobility solutions and alleviating grid congestion by regulating time-of-use for charging. In the coming years, SVCE will explore vehicle-to-building integration options to enable grid-supporting services such as frequency regulation, load balancing and peak shedding, which can also manage the anticipated load growth resulting from electrification.

Approach: Expand the SVCE Community Energy Resilience Grant program to support resilience hub developers in conducting preliminary design and needs assessments.[8]

What SVCE is doing:

- Expanding the Community Resilience Program webpage to include regional and state grants for resilience hubs as they become available

Future opportunities:

- Conduct pilot projects for integrating DER solutions into resilience hubs
- Partner with municipalities and community-based organizations (CBOs) to encourage resilience hubs at critical community facilities in non-English speaking and low-income communities

8 Resilience Hubs are community-serving facilities that coordinate resource distribution and services before, during, or after a natural hazard or power outage event. These services may include provision of electricity (for at least 72 hours), shelter, food preparation and storage, water and ice, restrooms and showers, basic medical supplies, charging stations, internet, and other amenities needed during and after an emergency. The role of a Resilience Hub can be customized to provide year-round services that promote local revitalization, social cohesion, and equitable development within a community.

PRINCIPLE IN PRACTICE | *INNOVATION ONRAMP RESILIENT SCHOOLS PILOT*

SVCE's Community Energy Resilience Grant program is opening the door to numerous opportunities to enhance energy resilience throughout the SVCE service area. For instance, grant funds can be used to develop resilience hubs – facilities that provide critical services to communities before, during, or after disruptive events. As such, the program has enabled partnerships with organizations across SVCE communities to reconfigure existing facilities into resilience hubs, such as SVCE's **Innovation Onramp Resilience Schools Pilot.**

Under this program, SVCE partnered with Extensible Energy and Community Energy Labs to support schools in operating solar and battery backup to serve as community resilience centers. This pilot demonstrated how load management technologies can optimize energy load profiles to match on-site renewable generation and battery storage. Schools participating in this pilot reduced time-of-use charges and maximized returns on up-front capital investments associated with islanding for the hosting school facility.

Guiding Principle #2

Ensure the provision of services and resources during power outages by investing in critical community sites.

The emergent, increasing uncertainty regarding climate hazards and their impact on power supply underscores the need for community preparedness. It requires that SVCE explore how it not only mitigates power outages, but also how it alleviates the impact of those outages on community members when they occur. To this end, SVCE is paying close attention to where community members may go for support during power outages and where SVCE can offer a helping hand to bolster those services and resources when possible.

Critical community sites are defined by this Framework as facilities that support community welfare, health and safety, emergency management and governance. These sites offer services that enhance community preparedness during outages. They are also often nodes within a community that provide support, resources or goods to community members on a regular basis, such as assisted living facilities and community centers, grocery stores and food banks, schools and libraries, fire stations, police stations and government buildings. During major disruptions or outages community members may turn to these sites for help, so it is imperative that they are available and functional — especially during such events.

Thus, SVCE's work is also guided by the principle that it ensures service provision during power outages by investing in critical community sites. This requires strategic investments throughout the SVCE service area that enable decisionmakers to complete energy resilience projects for critical sites in their communities. It also entails providing resources that help Member Agencies break down information and engage cross-departmentally to make investment decisions around energy resilience.

To these ends, SVCE is providing technical assistance, planning and capital grants for prioritizing community sites and selecting energy resilience solutions. These grants can be directly applied toward needs evaluations at the building or jurisdictional scale, such as detailed energy audits or energy storage system feasibility assessments. Going forward, SVCE will provide support to help decisionmakers better understand what is required for energy resilience based on building function, occupancy and energy performance, as well as what challenges may lie in the way with respect to permitting, interconnection and constructability.

Approach: Identify priority community sites, partners and solutions for energy resilience investments.

What SVCE is doing:

- Proposing a shared definition of critical community sites that are eligible for SVCE grants
- Piloted a web-based tool to help Member Agencies select and prioritize critical community sites and compare energy solutions
- Providing grants for planning and capital investments in critical community sites that support emergency management and community welfare during PSPS events and power outages

Future opportunities:

- Convene community partners and Member Agencies to discuss additional approaches to bolster community resilience

RESOURCES | *CRITICAL COMMUNITY SITES*

To ensure that resources are available for community members prior to and during power outages, SVCE must not only create and provide those resources directly, but it must also direct community members to other regional and state resources as they become available. Provided below are multiple resources, including funds available from the State of California and an SVCE-developed pilot tool that helps jurisdictions identify critical community sites for resilience projects.

STATE GRANTS FOR RESILIENCE HUBS

The State of California initiated the Environmental Justice Community Resilience Hubs Program (AB 1087) to eradicate pollution while ensuring that disadvantaged, low-income and vulnerable communities benefit from clean energy technologies. This program is a step towards establishing community resilience against wildfires, poor air quality, extreme heat, de-energization, storms and flood events.

The program offers competitive grants to owners of critical community institutions for building upgrade projects that demonstrate community engagement in all phases and demonstrate multi-stakeholder partnerships for energy resilience. The objective is to make clean, renewable and resilient energy systems fiscally accessible for disadvantaged populations. Additionally, the program intends to normalize the role of resilience hubs for daily utilization, while also protecting communities during extreme weather events.

The program shall be jointly operated among all the participating electrical corporations and will be managed by a single third-party administrator selected by the California Public Utilities Commission (CPUC). The program's eligibility criteria are still evolving, but it will support building upgrades at critical community institutions such as schools, libraries and affordable housing to enhance resilience against extreme heat and install backup technologies. Eligible SVCE Member Agencies can take advantage of this program after July 1, 2023.

SVCE RESILIENT SITE SELECTION TOOL PILOT

During climate and PSPS events, certain facilities take on an increasingly important role in protecting vulnerable populations and communities from grid disruptions. Critical community sites are facilities that support community welfare, health and safety, emergency management and governance, and can include community centers, grocery stores, food banks, public schools, government buildings and more. To support resilience planning efforts at these facilities, SVCE created an online platform designed to support Member Agencies in selecting critical community sites and energy solutions for enhancing community energy resilience. The Resilient Site Selection Tool allows users to filter facilities based on their location, use and hazard exposure. The tool simultaneously analyzes vulnerability and site-specific energy use to generate a list of priority facilities and further recommended energy solutions based on facility characteristics. It provides a high-level evaluation of system size, capital cost, backup duration and decarbonization potential of relevant on-site generation, storage and backup power systems that were potentially suitable for each site.

Approach: Develop energy audit and investment plans for integrating distributed energy resource and storage solutions at municipal facilities.

What SVCE is doing:

- Providing technical assistance to Member Agencies in navigating incentive and financing options for community energy resilience from regional and state sources
- Expanding the SVCE Community Resilience Grant program to support energy resilience audits at Municipal Facilities

Future opportunities:

- Educate municipal customers about renewable distributed energy resource backup options and assist with transitioning away from fossil fuels
- Support Member Agencies in sharing best practices and case studies

RESOURCES | *FINANCING FOR MUNICIPAL CUSTOMERS*

California's infrastructure and economic development bank, or IBank, administers financing for a wide range of climate and energy projects. IBank provides financing to public agencies and leverages state and federal funds for various energy resilience related projects through the Infrastructure State Revolving Fund (ISRF) Program, California Lending for Energy and Environmental Needs (CLEEN) and other bond financing programs. SVCE and its municipal customers, including city and county government entities, assessment districts and other joint power authorities (JPAs), are eligible for financing under ISRF and CLEEN Programs that support decarbonization and energy resilience.

ISRF Program	CLEEN Program
Applications are accepted on a rolling basis, and funding ranges from $50,000 to $25 million with terms up to 30 years.	Financing ranges from $500,000 to $30 million via direct loan with terms up to 30 years.
Financing can be used for costs related to architecture and engineering, construction, demolition, feasibility, renovation and acquisition, machinery costs and reserves.	Financing can be used for design, acquisitions, construction, developing eligible facilities, entitlements, improvements, planning and permitting.
Energy projects can focus on improvements in transmission or distribution, energy generation, energy storage, educational, communications, water treatment and distribution, public safety and other utility facilities.	Energy projects can focus on advanced metering systems, energy management, demand response programs, building systems and envelope, occupant plug load management, zero emission vehicles and thermal and electric energy storage.

Guiding Principle #3

Integrate energy resilience into existing and future building and transportation electrification programs.

SVCE's primary mission is to decarbonize grid electricity for customers within its service area. Electrifying building spaces and transportation systems are critical steps toward achieving decarbonization. However, electrification will increase energy demand and increase reliance on the electricity grid.

To manage and mitigate these risks, SVCE will integrate energy resilience into its programs — both existing and in development. This could include providing technical assistance for building managers and fleet operators to deploy solutions that support a more resilient grid and reduce the likelihood of local outages. Examples of solutions that can add energy resilience considerations into SVCE's decarbonization-focused programs include solar plus battery storage to provide backup energy, smart panels to minimize panel upsizing, efficient heat pump technology to reduce consumption, and managed electric vehicle charging and bi-directional charging stations. In addition, SVCE will investigate opportunities to improve local codes and policy and facilitate the integration of energy resilience into building and transportation systems.

SVCE has introduced multiple programs to support transportation electrification. SVCE developed **Electric Vehicle (EV) Infrastructure Reach Codes**, which go above and beyond state requirements to promote EV readiness and encourage equitable EV adoption, that have been adopted by most SVCE Member Agencies. In addition, SVCE developed the **FutureFit Assist: EV Charging Program**, focused on EV charging infrastructure for small- and medium-size businesses and multi-unit dwellings. In the coming years, SVCE will launch technical assistance programs for EV fleet operators and further support demonstration pilots for integrating charging systems and the grid.

With respect to building electrification, SVCE has worked with Member Agencies to set reach code goals, engage communities and identify cost-effective solutions for residents and businesses. SVCE's 2019 Reach Codes, adopted by 12 Member Agencies, work in conjunction with state and local building regulation to support all-electric new construction and incorporate resilience by encouraging the installation of distributed energy resources. In addition, SVCE's **Building Electrification Technical Assistance Program** provides technical assistance for all-electric retrofits and new construction.

Going forward, SVCE will provide further guidance during the next state building code cycle, which will focus on managing critical loads during power disruptions and emergency events.

Approach: Explore opportunities for vehicle-to-building (V2B) and vehicle-to-grid (V2G) pilot programs for electric fleet operators, accompanying managed charging for vehicle-to-grid integration (V1G) efforts.

What SVCE is doing:

- Developing an EV Fleet Electrification Program to support fleet and charging infrastructure management
- Scaling up V1G (managed charging) for residential customers and integrating with power procurement

Future Opportunities:

- Integrate V2B and V2G readiness requirements in future building and Reach Codes
- Demonstrate resilience benefits of V2B and V2G through pilot projects in partnership with Pacific Gas & Electric and Member Agencies
- Integrate smart charging infrastructure in SVCE Virtual Power Plant (VPP) programs

PRINCIPLE IN PRACTICE | *GRIDSHIFT INITIATIVES*

The transportation sector offers one of the biggest levers to pull to mitigate GHG emissions. However, electrifying transportation will increase grid demand for the foreseeable future. SVCE provides a program to help fleet owners and managers electrify their fleets with energy resilience in mind.

GRIDSHIFT INITIATIVES

SVCE's existing and upcoming virtual power plant (VPP) programs help customers and grid operators monetize the value of DERs. The programs can leverage grid-interactive devices such as storage, heat pump water heaters, thermostats and EVs to shift energy demand to and from the grid, thus functioning like a VPP. VPPs can help manage anticipated load growth resulting from electrification and reduce the need for peaker plants. SVCE is evaluating various strategies like real-time pricing, peak shedding and load shifting approaches that are best suited for its customers.

Approach: Encourage building interventions that support prioritization of critical loads in all-electric retrofits and new construction.

What SVCE is doing:

- Providing planning grants for assessing critical loads in new and existing buildings that serve as critical community sites
- Conducting pilot projects to test technologies for managing critical loads in all-electric buildings

Future opportunities:

- Encouraging distributed energy resource integration in all-electric buildings through Reach Codes and the Building Electrification Technical Assistance Program

PRINCIPLE IN PRACTICE |

Building spaces offer another substantive opportunity for decarbonization, but as with transportation, they are also a tremendous opportunity for community energy resilience. SVCE has developed reach codes and pilot programs to support building managers across residential, commercial and government sectors with incorporating resilient principles and technologies as they electrify.

SVCE BUILDING REACH CODES

SVCE worked in conjunction with its Member Agencies to develop building reach codes, which outline a tiered approach to move away from natural gas towards electricity in new construction. The codes highlight the benefits of electrification and how all-electric systems can be more resilient. Most SVCE Member Agencies have adopted these codes and are moving away from using natural gas. Tiered options include:

- **Option 1: All-Electric inside the building —** Restricts natural gas to outdoor applications only.
- **Option 2: High Reach (electric + natural gas inside) —** Allows natural gas for indoor applications, but typically requires wiring for future electrification, higher energy efficiency requirements or installing solar thermal or battery storage.
- **Option 2A: Mostly Electric (electric, except for gas cooking and/or gas drying) —** Allows indoor natural gas for cooking or drying purposes but usually requires pre-wiring for future electrification.

These reach codes enable DER integration and support futureproofing by requiring pre-wiring in buildings. SVCE will expand resilience requirements in the next building reach code update. SVCE will work with member agencies to develop additional options, such as points-based codes and emissions-based codes for cities that are interested in missions-based approaches.

Guiding Principle #4

Prioritize and integrate heat mitigation strategies into planning activities.

Urban areas experience higher temperatures than nearby rural areas due to the built environment and anthropogenic heat from industrial uses, also known as the urban heat island effect. Buildings and paved surfaces absorb and retain solar heat radiation, increasing both day and night temperatures. This can amplify the impacts of extreme heat, increasing the risk of heat-induced illnesses, elevated pollution levels and rising energy costs. In dense urban settings, the UHI effect can increase demand for AC during summer periods, which can increase grid demand — especially during heat waves.

Given the risks of extreme heat for people and spaces, SVCE will explore ways to integrate heat mitigation into its work and mitigate the UHI effect across its service area. Heat mitigation approaches include reducing paved surface area, improving built surface reflectivity, increasing urban tree canopy and vegetation and enhancing shade in urban spaces. These strategies reduce surface temperatures and heat retention in the built environment, lowering cooling energy needs while enhancing indoor and outdoor thermal comfort.

Heat mitigation interventions can be implemented at the building, neighborhood or city scale and are typically managed by municipal authorities and building or project developers. Implementing these interventions within multiple buildings in dense urban cores can result in measurable temperature reductions and generate energy savings. To address the UHI effect in Santa Clara County, SVCE will explore opportunities to help Member Agencies with building design interventions and utilizing grant options for heat mitigation. Additionally, member jurisdictions can also encourage or mandate cooling strategies through building design codes, engineering standards, permitting requirements, local ordinances and community and long-range plans. Finally, SVCE will consider heat mitigation when working on future programs.

Approach: Provide grants for cities to integrate cooling strategies into the built environment through ordinance development and reach codes.

What SVCE is doing:

- Expanding the Community Resilience Grant program to support Member Agencies in developing climate resilient design guidelines focused on heat and energy resilience

Future opportunities:

- Include heat mitigation and passive design strategies, such as green and cool roofs, in future code cycles
- Expand the Community Resilience Grant program to support targeted urban greening initiatives in lower income neighborhoods

PRINCIPLE IN PRACTICE | *MITIGATING UHI EFFECT THROUGH PLANNING*

The UHI effect amplifies the impact of extreme heat, increasing the risk of heat-induced illness for vulnerable populations such as young children, older adults, individuals with respiratory illnesses and those who work outdoors. While air-conditioned spaces and cooling centers can reduce heat-related mortality and morbidity, an increased need for cooling will exacerbate existing energy burdens for low-income households and grid strain during peak load hours.

As cities face higher temperatures and more intense heat waves, governments are embedding UHI mitigation strategies into local planning efforts by: (1) developing tailored programs to protect vulnerable individuals and communities who lack capacity or resources to cope with increased temperatures; (2) leveraging municipal codes and community-wide plans to alleviate UHI effect through design principles; and (3) enforcing building design codes, engineering standards and permitting processes to reduce cooling needs in new developments and major renovations.

Many SVCE jurisdictions are encouraging UHI mitigation strategies using planning and programmatic efforts:

- The **City of Milpitas** encourages sustainable design practices and policies through the Milpitas General Plan 2040. The plan encourages passive solar design, energy conservation, energy-efficient building materials and green roofs in new buildings. The City incentivized these practices by introducing a Green Building Ordinance in 2014, offering expedited permitting for building projects in compliance with green building regulations.
- The **Cities of Sunnyvale and Cupertino** encourage various urban heat mitigation strategies through their climate action plans. Sunnyvale encourages cool roofs and pavements to reduce UHI effect and energy needed for cooling. The City also requires all new and resurfaced parking lots, sidewalks and crosswalks to be made with high-reflectivity paving materials, which retain less heat than traditional sealants. The City mandates cool roofs at all new multi-family, commercial and industrial buildings in alignment with the California Green Building Standards Code – Part 11, Title 24, California Code of Regulations (CALGreen). Along similar lines, the City of Cupertino is evaluating opportunities to expand current ordinances and codes to prioritize expansion of City's green and cool roofs, as well as pervious and cool pavement.
- Demonstrating the tangible benefits of UHI mitigation strategies, the **City of Saratoga** installed a cool roof at the Joan Pisani Community Center in 2014. This project is estimated to have reduced the cost of air conditioning by up to 30 percent. Since then, the City has used its facility maintenance budget to install cool roofs at multiple locations including City Hall, the civic theater and the senior center.
- The **Cities of Sunnyvale, Campbell and Saratoga** operate tree planting campaigns in partnership with Our City Forest, a nonprofit urban forestry and environmental stewardship leader in Silicon Valley. Property owners can apply for one or two street trees to be planted in their front yard or street side. Urban greening programs such as Our City Forest can mitigate the UHI effect and enhance the streetscape at low to no cost to homeowners.

Guiding Principle #5

Develop regional partnerships to spur local energy resilience research and implement projects.

In recent years, research has been conducted to better understand climate vulnerabilities within and across regions and to consequently inform energy resilience programs in California. However, to successfully develop and implement these programs, it will require regional partnerships where governments and community partners can coordinate on community and grid-scale investments.

SVCE has a role to play in developing and fostering new partnerships and strengthening existing ones. To do this, SVCE has leveraged existing research efforts from its partners at the State level, the County of Santa Clara, PG&E and other regional networks to not only help develop this Community Energy Resilience Framework, but also to identify pilot opportunities for local energy resilience projects. For example, SVCE has initiated pilots under the VPP and Innovation Onramp programs to integrate distributed energy resource solutions into the power grid.

SVCE will consider supporting additional research for guiding grid-scale investments and navigating legislative and regulatory barriers for multi-customer solutions, such as community microgrids and shared EV charging hubs. To further accelerate implementation, SVCE will also explore partnership opportunities with PG&E and third-party vendors to consider business models for deploying DER solutions that enable decarbonization and local resilience. Finally, SVCE will help provide educational resources to Member Agencies to help them reach their energy resilience goals.

Approach: Leverage existing vulnerability and energy resilience research to guide grid-scale investments in the region.

What SVCE is doing:

- Exploring energy-as-a-service models for leveraging DERs to reduce the need for upstream investments
- Supporting third-party organizations in conducting innovative demonstration pilots for grid-supporting services

Future opportunities:

- Elevate existing research and educational materials on regional energy vulnerabilities and resilience through the SVCE Community Energy Resilience webpage

RESOURCES | *REGIONAL TOOLS FOR ENERGY RESILIENCE*

In the past decade, significant research on climate vulnerabilities, their impacts on grid assets and needs for resilience investments has become available. In addition to State Agencies, institutions such as the Association of Bay Area Governments (ABAG), County of Santa Clara Office of Emergency Services and Office of Sustainability and Climate Action, Bay Area Climate Adaptation Network (BAYCAN) and PG&E have already laid out the groundwork for community energy resilience planning. In the process of developing the Community Energy Resilience Program, SVCE has leveraged existing tools and literature focused on Bay Area communities.

SILICON VALLEY 2.0 TOOL AND REPORT

In 2015, Santa Clara County published Silicon Valley 2.0, a detailed report highlighting the potential impacts of climate change on the region. The report complements a decision-support tool designed to assist local agencies in understanding the potential impacts of climate change on their communities and infrastructure. The tool assesses climate vulnerabilities and risks and identifies priority themes for mitigating the impacts of extreme heat, drought, flooding and sea-level rise.

BAY AREA CLIMATE ADAPTATION NETWORK (BayCAN)

BayCAN is a regional advocacy and community network that connects local government staff and organizations in the Bay Area who are working on climate change response. The organization also puts forth a suite of documents and reports aimed at increasing the knowledge base of participants and the greater region. BayCAN tracks adaptation projects, stretching from Napa down through Santa Clara counties, connecting efforts across the region to empower members of the network. BayCAN continues to publish webinars and resources on adaptation measures, PSPS events and resilience hubs to support local and regional planning efforts.

Approach: Identify renewable microgrid site opportunities and pursue state/utility funding for implementation.

What SVCE is doing:

- Participating in CPUC proceedings and streamlining efforts for microgrid deployments

Future opportunities:

- Inform Member Agencies about renewable microgrid opportunities and state, utility and federal funding opportunities
- Conduct distribution or circuit-level analysis in partnership with PG&E to inform microgrid investments in SVCE territory

RESOURCES | *FUNDING FOR MICROGRID OPPORTUNITIES*

SELF-GENERATION INCENTIVE PROGRAM (SGIP)

SGIP is the state's premier incentive for energy storage and on-site generation technologies. In 2020, SGIP began offering more than $1 billion to install energy storage in households and critical facilities. The program prioritizes communities in high-fire-threat areas and customers subject to PSPS events, as well as low-income and medically vulnerable customers. The SGIP budget for the 2020-2024 cycle is administered through a competitive incentive process, offering two categories of rebates: (1) **Equity Rebates**, which support single-family households, multi-family households and non-residential customers in disadvantaged communities or census tracts with median incomes under 80%; and (2) **Equity Resiliency Rebates**, which are for residential and non-residential customers in Tier 2 or 3 high-fire-threat districts who have experienced two or more PSPS events or are in disadvantaged or low-income communities. These rebates are also available for specific critical facilities that support community resilience in the event of a PSPS or wildfire. SGIP incentives can cover project installation costs and greatly improve the economic viability of adding battery storage to microgrid and district energy projects.

COMMUNITY MICROGRID ENABLEMENT PROGRAM (CMEP)

The CMEP is a community microgrid designed by PG&E to serve places with the highest resilience needs. The program is structured through project vetting, solution assessment and solution execution. To qualify for the CMEP, communities must be in a Tier 2 or 3 high-fire-threat district, be affected by PSPS events or have consistently experienced power outages. PG&E will prioritize disadvantaged vulnerable communities as defined by CalEnviroScreen, Tribal lands, rural areas or those who live in areas where over 50% of residents within the zip code are eligible or enrolled in California Alternative Rates for Energy (CARE). The CMEP program provides both technical and financial support and self-service materials including a resilience planning guide, technical practices, planning tools and federal, state and local incentives. The CMEP will cover all the equipment costs, such as operations for up to $3 million per microgrid, but does not cover any generation, storage or system upgrade costs.

RESOURCES | *ENERGY FUNDING FOR MICROGRID OPPORTUNITIES*

ELECTRIC PROGRAM INVESTMENT CHARGE (EPIC) FUNDING

EPIC was designed to fund investments towards advancing clean energy technology and create the pipeline for bringing clean energy ideas to the marketplace. The funding supports applied research and development, technology demonstration and deployment and market facilitation of clean energy technologies. EPIC funds can be used for installing renewable energy systems, building resilience in electricity system, implementing decentralized electric grids, improving electricity affordability and advancing new technologies for transportation, buildings and California businesses. EPIC funding has been used for various microgrid projects to demonstrate their ability to provide clean and resilient energy in the event of grid failure. To qualify for EPIC funding, 25 percent of beneficiaries must be in disadvantaged communities, while another 10 percent must be in low-income communities. Minority-owned, women-owned, disabled veterans and LGBTQIA+ businesses are encouraged to apply.

BUILDING RESILIENT INFRASTRUCTURE AND COMMUNITIES (BRIC) FUNDING

BRIC is a program put forth by the Federal Emergency Management Agency (FEMA) to provide funding for pre-disaster hazard mitigation. Funds can be utilized for mitigation projects, capability and capacity-building activities and management costs. Through BRIC, FEMA aims to incentivize projects that support public infrastructure, mitigate risk to one or more lifelines, incorporate nature-based solutions and incentivize adoption of modern building codes. Applications must showcase an innovative idea and implementation approach, demonstrate risk reduction potential and population impact, identify potential partnerships and outreach and establish community lifelines.

CONCLUSION

The reality of climate change is indisputable, and communities across Silicon Valley are already facing its impacts. Silicon Valley residents have seen their share of power disruptions because of wildfires and extreme heat, which can have cascading impacts beyond the lights going out. Entire families, communities and infrastructure systems are subject to the ramifications of these disruptions, which can threaten the ability of people to meet their own basic needs. As local agencies come to better understand both how these impacts manifest and how they will impact the most vulnerable communities, SVCE acknowledges that these circumstances will only worsen until it decarbonizes the grid and builds community resilience in a way that is effective, equitable and lasting.

SVCE developed this Community Energy Resilience Framework to identify how, as a provider of clean energy and a mobilizer for decarbonization, it can develop and share the tools and resources necessary to build out community energy resilience across Silicon Valley – now and into the future. The Framework, supported by guiding principles and approaches, is intended to look forward: showcasing where SVCE can proactively invest in resilience, while pursuing its decarbonization mission, so that the communities it serves are not only ready for the climate-driven disruptions that await them, but also are able to thrive in the face of those events.

Resilience is not an endpoint. Rather, it is a process that requires iterative and ongoing action that results in the creation and implementation of adaptive programs and systems that support and shape how people live and move around. The future is always unpredictable, but there is a lot SVCE can do now to help Silicon Valley navigate and prosper going forward. SVCE invites its Member Agencies, jurisdictional and community partners and community members to join in on efforts to create a decarbonized, resilient and equitable Silicon Valley.

GLOSSARY

AB: Assembly Bill

ABAG: Association of Bay Area Governments

AC: Air Conditioning

BayCAN: Bay Area Climate Adaptation Network

BRIC: Building Resilient Infrastructure and Communities

CalGREEN: California Green Building Standards Code

CARE: California Alternate Rates for Energy

CCA: Community Choice Aggregator

CHP: Central Heating Plant

CLEEN: California Lending for Energy and Environmental Needs

CMEP: Community Microgrid Enablement Program

CPUC: California Public Utilities Commission

DER: Distributed Energy Resource

EPIC: Electric Program Investment Charge

EV: Electric Vehicle

FEMA: Federal Emergency Management Agency

FERA: Family Electric Rate Assistance Program

FHSZ: Fire Hazard Severity Zone

GHG: Greenhouse Gas

ISRF: Infrastructure State Revolving Fund

JPA: Joint Power Authority

MCE: Marin Clean Energy

PG&E: Pacific Gas and Electric

PSPS: Public Safety Power Shutoff

SCP: Sonoma Clean Power

SGIP: Self-Generation Incentive Program

SVCE: Silicon Valley Clean Energy

UHI: Urban Heat Island

V1G: Smart Charging

V2B: Vehicle-to-Building

V2G: Vehicle-to-Grid

VPP: Virtual Power Plant

SILICON VALLEY
CLEAN ENERGY